NEWS CIRCULAR---Utah Agricultural Experiment Station

#17

Logan, Utah. April_____ 1926

MT. LOGAN SNOW SURVEY APRIL 1, 1926

By George D. Clyde
Utah Agricultural Experiment Station

The heavy storms which occurred the last two days of March and the first day of April very materially improved the water supply outlook for Cache Valley. Up to March 30, it was the driest March since 1896. The storm of March 30 and 31 raised the total precipitation for the month to 0.69 inch, which is only 35 per cent of the normal for March. In the mountains the precipitation was much heavier, particularly above 7500 feet elevation. A report of the snow cover on Mt. Logan on April 1 shows that two feet of new snow containing 5 inches of water fell during the last storm. This added very much to the prospective water supply. On March 1, 1926 there were 62 inches of snow containing 18.0 inches of water at elevation 8700. On April 1, 1926 there was 72 inches of snow containing 22 inches of water or an increase of 4 inches over the water content recorded on March 1.

The warm weather which occurred during March preceding the last storm decreased the water content by losing more than an inch of its water in the ground. Below 7500 feet the precipitation occurred mostly in the form of rain or sleet, and the measurements at 7000 feet indicate an actual decrease in water content of snow cover over March 1. On March 1, the depth of snow was 42 inches and contained 11.6 inches of water. On April 1, the depth of snow was 38 inches and contained 9.4 inches of water, the difference plus the precipitation during March

having been absorbed by the soil.

Table showing the depth of snow cover in inches, as measured on Mt. Logan on April 1, of each year during 1921 to 1926, inclusive.

	Stake No. 3 (7000 feet)	Stake No. 4 (8200 feet)	Stake No.5 (8700 feet)
Average	43	70	80
1921	46	67	81
1922	55	78	98
1923	55	75	102
1924	53	74	86
1925	36	68	73
1926	38	65	72

The depth of snow cover this year compares favorably with that on April 1 last year, but the water content this year is below that of a year ago. On April 1, 1925 the water content of the snow cover at 8700 feet elevation was 32. inches while on April 1, 1926 it was only 21 inches, or a decrease over last year of 11 inches of water. This year, however, the soil seems to be well saturated and the absorption losses will be small. In view of the recent storms and prime condition of the soil the water supply situation is not necessarily alarming in this valley, but plans should be made to utilize as far as possible all water flowing from the mountains. Ditches should be cleaned early and held in readiness to spread the high water. The spring runoff, if temperature is normal, will probably be large, but in light of the deficient snow cover the late-season water supply is expected to be small. A strict program of water conservation should be planned and rigidly enforced.

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No. 15 Logan, Utah, April _____ 1926.

OUTLOOK FOR WATER SUPPLIES IN THE UINTAH BASIN

By George D. Clyde
Utah Agricultural Experiment Station

Available records indicate that the runoff from the Uintah Basin watershed during 1926 will be about equal to that of 1924 and 1925, two of the driest years since 1915. There are few reservoirs of any magnitude in the Uintah Basin. The waters serving this area must therefore be used when they come or not at all.

The years 1924 and 1925 were extremely dry. During the fall of 1925 heavy rains fell in that section and soaked up the ranges. The wet season, however, did not extend on through the winter. The winters of 1924, 1925, and 1926 were open with little snow.

The United States Weather Bureau, working in cooperation with the Forest Service, have made observations of the snow cover for about eight years. The points of observation are fairly well scattered over the basin and indicate the extent of the snow cover. However, due to wide variations in snowstake readings from year to year, snow-survey courses must be established before reasonably accurate forecasting of the stream flow can be made. Until such courses can be established and snow-surveys made, the snowstake data published by the Weather Bureau furnish the best information available on which to make an estimate of the probable water supply. Thirteen stations between the elevations 6900 to 9800 feet have been averaged to show the relative extent of the snow cover each year since 1918.

On April 1st of each year from 1918 to 1926, inclusive, an average of the thirteen stations on the Uintah Basin watershed indicated a depth of

water over the shed as follows: 1918, 1.6 inches; 1919, 3.3 inches; 1920, 8.0 inches; 1921, 3.6 inches; 1922, 11.7 inches; 1923, 9.7 inches; 1924, 7.5 inches; 1925, 3.3 inches and 1926, 3.4 inches. The most severe shortage based on the above records occurred during 1918, but stream-flow records show that practically the same amount of water ran off in 1918 as in 1924 and 1925.

In view of a possible water shortage and an absence of storage reservoirs, a strict program of water conservation should be outlined and carried out. The effect of a water shortage can be materially reduced if the users are prepared to use the spring runoff when it comes; if they will adopt the most advanced methods of irrigation; if they will irrigate at night instead of letting the water run on the pasture; and if they will cooperate so as to permit of the combining of streams and of rotation in order to maintain the most efficient size of stream and to reduce waste.

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No .14 Logan, Utah, April ___ 1926.

OUTLOOK FOR WATER SUPPLIES ON THE SALT LAKE WATERSHED

By George D. Clyde
Utah Agricultural Experiment Station

The ultimate duty of the Salt Lake watershed will be able to furnish a municipal supply for Salt Lake City and the surrounding communities. At the present time the streams tributary to the Jordan River between the point of the mountain and the Utah Oil Refining Plant on the east side furnish municipal and irrigation supplies for all of Salt Lake County east of the Jordan River. Salt Lake City has several storage reservoirs where water is stored for municipal use during the low-water period. Because Salt Lake City is so vitally interested in the source of her water-supply she has made each year for several years a seasonal survey of the snow cover on the Salt Lake watershed to determine in advance, if possible, the available water supply. Surveys in the past have been conducted in City Creek, Parley's and Big Cottonwood Canyons, but at the present time are confined to the Brighton Basin in Big Cottonwood Canyon. The years 1924 and 1925 carried a snow cover considerably below normal, and a knowledge of this condition early in the season permitted plans to be made for the conservation of water before the reservoirs were emptied.

In addition to the surveys made by Salt Lake City, the Weather Bureau has maintained snow stakes at various points on the watershed. These data are used as a basis for forecasting the probable available water-supply for the succeeding season. At Silver Lake in the Brighton Basin there are several snow stakes, the average of which are reported

as Silver Lake Station. The mean elevation of these observations is about 9000 feet. Alta, in the head of Little Cottonwood Canyon, also reports the snow depth and water content. Park City, near the head of Parley's Canyon, at 7000 feet is also used as an indicator of the average snow cover. Snow surveys based on the fixed course and percentage relationship method have not yet been established on this watershed, and therefore the forecasts of available water supply must be based on thisabove named stations. These stations are not sufficient to make an accurate forecast possible, but they are good indicators.

On April 1, 1918 there were 20 inches of water in the form of snow at Silver Lake. This snow cover yielded an annual runoff only 80 per cent of normal. On April 1, 1919, the snow cover at Silver Lake contained 17 inches of water and the annual runoff from Big Cottonwood was only 75 per cent normal. On April 1, 1920 there were 20 inches; 1921, 23.5 inches; 1922 34.7; 1923, 30 2; 1924, 18.7; and in 1925, 21.8 inches of water at Silver Lake. During 1924 it took 18.7 inches of water on April 1st. to produce 60 per cent of the average annual runoff .

Considering the three stations, Silver Lake, Alta, and Park City, the average on April 1st for 1920 was 14.3 inches; 1921, 17.0 inches; 1922, 28.2 inches; 1923, 25.2 inches; 1924, 13 4 inches; 1925, 15.0 inches, and 1926, approximately 12.0 inches.

From the above figures it appears that there was less water on the watershed this year on April 1st than in any year since 1920. The storms which occured on March 30 and 31 are not included in the above figures, and they no doubt materially improved the situation.

The outlook for water on the Salt Lake watershed is not alarming, but there is, nevertheless, a real need for exercising the greatest caution in utilizing available supplies. All water should be stored as long as there is storage capacity. The irrigation interests, who draw their supplies from this watershed and who have no storage reservoirs should be prepared to utilize to the fullest extent all of the high water that may come. This should be put on the land and not allowed to run to waste. In view of the possibility of a water shortage, a program of conservation should be started at once and rigidly enforced throughout the season.

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1926

SEVIER RIVER WATERSHED

The prospects for a good supply of irrigation water during the year 1926 are poorer than ever before. Since October 1, 1925 there has been a marked deficiency in the accumulation of precipitation at all the valley stations. October was a month of heavy precipitation but November, December, and January were below normal. The fall storms, however soaked up the ranges and there is a fair supply of moisture in the soil. No storms of any consequence occurred in the Sevier Valley before the middle of February. The snow cover over the Sevier river watershed is the lightest that has been known since records have been kept. There is practically no snow below the 8000 foot elevation and a relatively light cover above. The snowcover on the East side of the Pahvant Range is very light. In the Clear Creek section the snow cover is fair above the 8500 foot contour but there is practically no snow below that elevation. The Panguitch Lake section is practically devoid of snow. There has been little drifting and there are few snow banks anywhere on the watershed. The mountains of the Sevier watershed were free from snow until February and then there was little wind to cause drifting after the February snow fall.

Panguitch Lake is at an elevation of 8800 feet and normally carries on April 1 a heavy snow blanket. The East fork of the Sevier has been open all winter. On March 25 there was very little snow left on the watershed. The pass into Esca-

lante Valley has been open all winter and the Escalante range carries only a very light snow cover. The old timers in the East Fork and Panguitch Lake sections say this is the driest year they have ever known and they have been in the section for 40 years.

The United States Weather Bureau in cooperation with the Forest Service has maintained for about 10 years snow stakes at different points on the watershed. The average of these snow stake readings is indicative of the average snow cover. The year 1919 was one of the driest years known on the Sevier River. Beginning with 1920 the average snow stake readings have been as follows: 1920, 5.7 inches; 1921, 3.9 inches; 1922, 6.4 inches; 1923, 8.8inches; 1924, 4.3 inches; 1925, 4.6 inches; 1926, 3.3 inches. There are no records available for 1919, in which the water supply was more difficient than in 1921, the lowest year of the above group. 1921 was a low water year but by strict conservations and a good supply in the reservoirs to start with the shortage was not serious. Basing conclusions upon the averages given above the 1926 snow cover is slightly more than one-half the average and considerably below the short years of 1924 and 1925.

The year 1926 is the third of three successive dry years. The ground storage is therefore pretty well exhausted. In December 1923 the mean flow at Gunnison was 500, in December 1924 it was 485, in December 1925 it was 725 cubic feet per second, and in January 1926 it was only 59% of last year's. There is very little

water flows past the Piute reservoir and only a few small feeders between Piute and the Gunnison station. The flow past the Gunnison station is, therefore, nearly all return flow chich was this year less than one-half that of 1925. Measurements on drains in Sevier valley indicate approximately the same decrease in drainage runoff.

The combined storage capacity on the Sevier river is sufficient to completely control the mean annual runoff. This year the reservoirs were only partly filled on April 1 when the irrigation season and draft on the reservoirs begins. The total amount of water in storage on April 1 this year was considerably less than in any previous year. The three main storage reservoirs on the Sevier River are, Sevier Bridge (capacity 250,000), Piute (capacity 71000), and Otter Creek (capacity 52000). On March 1 the Sevier Bridge reservoir contained in 1923, 215,000 acre feet; in 1925, 95,500 acre feet; and in 1926, 79,650 acre feet. On March 22, 1925 it contained 106,300 and on March 22, 1926, 88,900 acre feet. On March 19, 1925 the Piute reservoir contained 46,988 and on March 19, 1926 40,990 acre feet. On March 15, 1925 the Otter Creek contained 23,680 and on March 14, 1926, 21,120 acre feet. These figures show a defficiency of 17,500 acre feet in Sevier Bridge, 8,000 acre feet in Piute and a gain of 2,500 acre feet in the Otter Creek. On April 1 the Otter Creek storage was about the same as last year and the Sevier Bridge and Piute

showed a greater defficiency than indicated above.

The total inflow into the Piute Reservoir on April 1 is only one-half what it was a year ago. The irrigation season started on April 1 with a 50% cut on all primary water. Last year there was sufficient natural flow to supply 100% primary rights nearly all thru April. The defficient snow cover eliminates any possibility of an increase in primary and storage may have to be drawn to supply the shortage.

In view of the fact that Sevier Valley faces this year a defficient water supply, close cooperation between all users and interested parties is strongly urged and it is recommended that on streams where no storage is available, ditches be held ready to catch any high water that may come off and that the lands be irrigated heavily as long as the high water lasts. On lands below storage reservoirs irrigation should be practiced sparingly and the water stored for use later in the dry season. Unless there is a defficiency in the spring rains which would make it necessary to irrigate to supply moisture for the seed beds it is advised that all primary water, together with any high water be stored during April to supply late season demands. The acreage of crops requiring late season water should be restricted and improved methods of irrigation should be practiced. Cultivate to conserve moisture and shine up the lantern that the water may be watched during the night as well as the day.

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Barring abnormal precipitation during spring and summer the indications are that the valley faces an extreme shortage. However, with carefuld use of existing supplies and cooperation between all parties on the river the effects of the shortage may be reduced to a minimum. In 1919 the prospects for water were poor but by careful use of water and the elimination of waste a prospective poor year was turned into one of the best crop years Sevier Valley has ever had. In 1919 the Valley had a greater storage supply to start with and a better primary flow to get the crops started. This year greater care will be necessary in light of the small amount of storage and low primary flow. 1921, 1924, and 1925 were other years in which the water supply in the Sevier Valley was short. The effect of a water shortage during these years was materially reduced by careful methods of irrigation and the proper use of available storage water. The season of 1926

faces a more severe water shortage than any of the years mentioned above. A more careful use of the existing supply of stored water will relieve to a very great extent the impending shortage. Whereever primary water is needed it should be stored for later use, and any high water that may come should be stored whenever possible. Be prepared to make the most of the spring rains. Let the spring rains take the place of irrigation whenever possible and conserve the irrigation water for later use. This can often be done to a good advantage on streams such as the Sevier where storage is available.

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